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Procedia - Social and Behavioral Sciences 210 (2015) 43 – 51

Procedia
Social and Behavioral Sciences

4th International Conference on Leadership, Technology, Innovation and Business Management

A Theoretical Model Proposal: Personal Innovativeness and User Involvement as Antecedents of Unified Theory of Acceptance and Use of Technology

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Abstract

An emerging stream of work on technology acceptance and innovation diffusion complements a large body of literature that points to users' technology acceptance behavior. In this paper, we argue theoretically that technology acceptance should be integrated into diffusion of innovation theory, so both concepts should be explained at the same framework. On the other hand, acceptance behavior is explained many other constructs, such as user satisfaction, user involvement. Unlike the previous research, we propose an overall framework to explain acceptance behavior and system implementation success. Hence we use unified theory of acceptance and use of technology. After that we try to create a linkage with this theory and personal innovativeness and user involvement as antecedents by providing some propositions. We will test these propositions in a field research for future research.

Keywords: Technology Acceptance Model, Innovation Diffusion Theory, Personal Innovativeness, User Satisfaction, User Involvement. Unified Theory of Acceptance and Use of Technology

Peer-review under responsibility of the International Conference on Leadership, Technology, Innovation and Business Management

1. Introduction

Technology acceptance is becoming a vital part of information technology studies. In some researches, this concept is handled in terms of several models. Many authors try to relate technology acceptance with other concepts such as user satisfaction, diffusion of innovation, etc. There is an evolution about progress in technology acceptance model. In this paper, we consider unified theory of acceptance and use of technology (Venkatesh et al., 2003). This paper aims to clarify the concepts of technology acceptance model and personal innovativeness and user involvement by means of integrating these concepts to explain the technology usage behavior. We propose a model that includes technology

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Peer-review under responsibility of the International Conference on Leadership, Technology, Innovation and Business Management
doi:10.1016/j.sbspro.2015.11.327

acceptance, personal innovativeness and user involvement and put forward some propositions. The proposed model will be tested empirically in our future research.

2. Literature Review

2.1. Evaluation of Technology Acceptance Concept

2.1.1. Technology Acceptance Model

Technology acceptance is a construct put forward by Davis (1989) explaining the user behavior towards a technology or system having been implemented by institutions (Malhotra, Galetta, 1999). Employees use different kinds of systems to accomplish their tasks in their companies. Especially, changing the existing system induces employees to reject using new system. On that point, technology acceptance is an important concept to adopt employees' behavior towards new technologies or systems. In order to state technology acceptance model (TAM) and explain it, Davis (1989) focuses on perceived usefulness and perceived ease of use concepts as determinants of attitude towards using, intention to use and actual usage (see in Figure 1).

Following the model, people incline to use a system whether it gets their job performance improve that is entitled "perceived usefulness" and whether it is useful for their tasks entitled "perceived ease of use" (Pfeffer, 1982; Schein, 1980; Vroom, 1964; Radner, Rothschild, 1975). So perceived usefulness is defined as *"the degree to which a person believes that using a particular system would enhance his or her job performance"* and perceived ease of use *"the degree to which a person believes that using a particular system would be free of effort"* by Davis (1989).

Technology Acceptance Model is explained on the basis of Theory of Reasoned Action and Theory of Planned Behavior. Concepts in those three models have causal linkages from attitude to behavior, as seen in Figure 2 and Figure 3 in Table 1. In addition, perceived usefulness, one of the components of technology acceptance model has close meaning of subjective norms in Theory of Reasoned Action and Theory of Planned Behavior. Unlike others, Theory of Planned Behavior has perceived behavioral control dimension that means *"perceived ease or difficult of performing behavior"* (Ajzen 1991).

Growing body of researches assert that the success of a system implementation is measured by actual system usage (Delone, Mclean, 1992, Delone, 2003; Danet, 2006). In addition, there are many researches having been explained the implementation success through attitude towards the system (Malhotra, Galetta, 1999) or intention to use it (Malhotra, Galetta, 1999; Livari, 2005).

Extending theoretical perspective on technology acceptance model, we can found emerging stream of work that explained the acceptance behavior via psychological attachment (Malhotra, Galetta, 1999), diffusion of innovation (Carter, Belanger, 2005; Agarwal, Prasad, 1997), user involvement, user resistance, user self-efficacy (Danet, 2006), user satisfaction (Doll, Torkzadeh, 1988; Livari, 2005), trust (Carter, Belanger, 2005) and voluntarism (Agarwal, Prasad, 1997).

2.1.2. Innovation Diffusion Theory and Innovation Characteristics

Theory of Diffusion of Innovation refers to employees' adoption of a new system or technology implemented by companies. Diffusion of Innovation put forward by Rogers (1983) identified as *"the process by which an innovation is communicated through certain channels over time among the members of a social society"*. He also explains innovation diffusion through four dimensions, relative advantage, complexity, trialability, observability, as seen in Figure 4 in Table 1.

Furthermore, Moore and Benbasat (1991) take the theory of innovation diffusion step further and explain it by means of seven dimensions, relative advantage, ease of use, compatibility, image, result demonstrability, visibility, trialabiliy. Relative advantage refers to employees' perception that the innovation takes some advantages for their job performance. According to Moore and Benbasat (1991) relative advantage is analogous to perceived usefulness in technology acceptance model put forward by Davis (1989). The second dimension, complexity is defined as the system implemented by firms is easy to learn and free of effort for employees. As seen the definition, Moore and Benbasat (1991) propose that complexity is similar to perceived ease of use in technology acceptance model. In addition, compatibility is identified as *"the degree to which an innovation is perceived as being consistent with the existing values, needs, past experiences of potential adapters."* (Rogers, 1983, p. 195) The concept of image representes a status symbol for potential adopters. Moore and Benbasat (1991) separated the construct of observability,

indicated by Rogers (1983) before, two different construct as result demonstrability and visibility. Employees attain concrete evidence, after using the innovation so this means system is demonstrated results evidently. (p.203) Visibility refers being able to seen innovation indications in the adoption context. Eventually, trialability is defined as having been a chance to experiment with the innovation by potential user. As illustrated the model in Figure 5, Table 1, Moore and Benbasat contribute the innovation diffusion model one more dimension, voluntariness of use and define as *"the degree to which the results of an innovation is perceived as being voluntary or through one's free will."*

2.1.3. Unified Theory of Acceptance and Use of Technology

As mentioned before, technology acceptance model is explained at the root of Theory and Reasoned Action and Theory of Planned Behavior (Malhotra & Galetta, 1999). In addition, some part of technology acceptance model has similar in Diffusion of Innovation Theory, especially perceived ease of use and perceived usefulness (Moore and Benbasat, 1991). Consequently, Venkatesh et.al. (2003) integrated those theories into a model entitled Unified Theory of Acceptance and Use of Technology, as seen in Figure 6, Table 1.

As indicated in Figure 6, performance expectancy consists of perceived usefulness, relative advantage, job-fit and extrinsic motivation and is defined as *"the degree to which an individual believes that using the system will help him or her attain gains in job performance."* Effort expectancy comprises of perceived ease of use and complexity referring to whether the system is user-friendly. Social influence has subjective norm, social factors and image and is identified as *"the degree to which an individual perceives that important others believe he or she should use the new system"*. Finally, facilitating condition includes perceived behavioral control, compatibility, facilitating situations and defined as *"the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system"* (Venkatesh et. al., 2003)

In general acceptance and use of technology researches tend to focus on drivers of usage intention such as perceived usefulness, perceived ease of use and some technological external variables. However it is also related with personal traits and these traits can be potentially important determinants of technology adoption as well.

Table 1: Evaluation of Unified Theory of Acceptance and Use of Technology

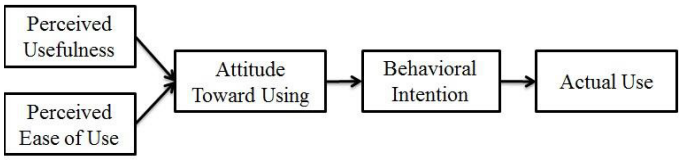

Figure 1. Technology Acceptance Model (Davis, 1989)

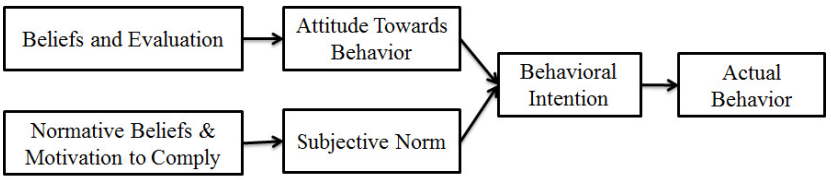

Figure 2. Theory of Reasoned Action (Fishbein, Ajzen, 1975)

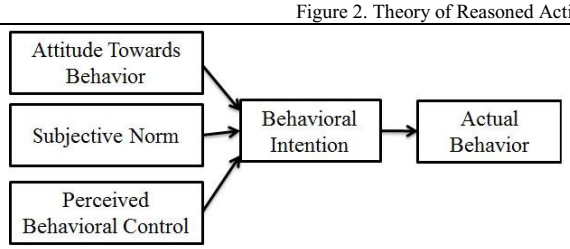

Figure 3. Theory of Planned Behavior (Ajzen, 1991)

Table 1: Evaluation of Unified Theory of Acceptance and Use of Technology (continue)

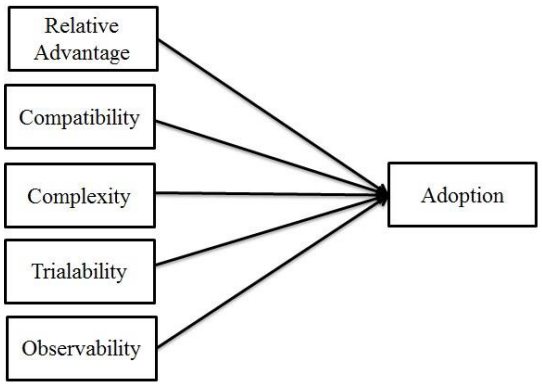

Figure 4. Diffusion of Innovation Theory (Roger, 1983)

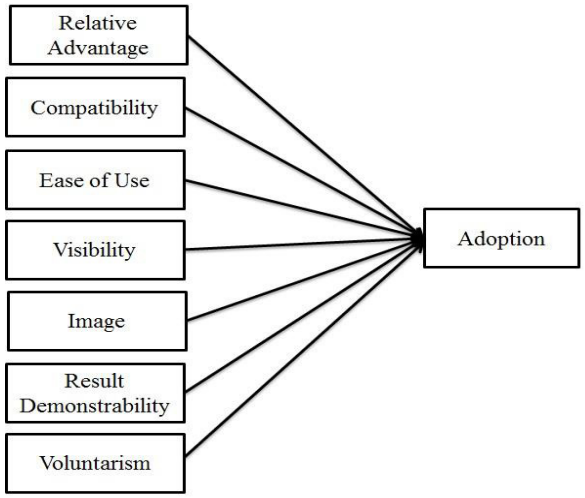

Figure 5. Refined Diffusion of Innovation Model by Moore and Benbasat (1991)

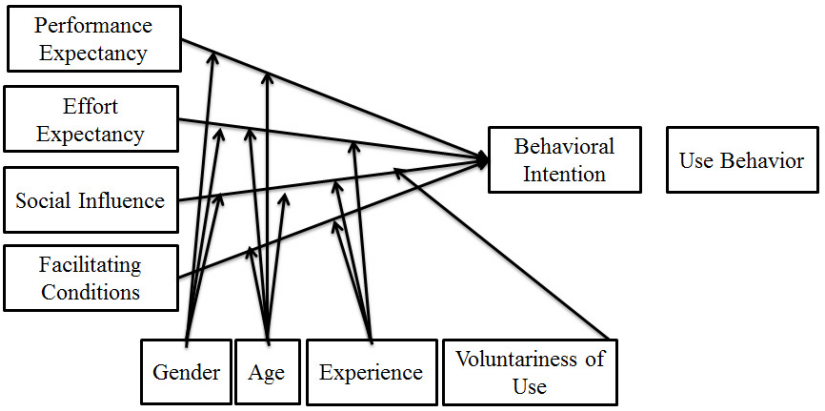

Figure 6: Unified Theory of Acceptance and Use of Technology (Venkatesh et. al., 2003)

2.2. Personal Innovativeness

Individual users are known to differ in their tendency to adopt new technologies (Nov, Ye 2008). Some authors have tried to answer to 'what is the relationship between individual differences and technology acceptance behavior?' question and measure it at multilevel. The researches showed that the success of an technological system implementation also depends on individuals differences as much as the other factors (Lu et al., 2003, 2005).

Innovativeness is "*the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a social system"* (Rogers, 2002, 2005). Agarwal and Parasad (1998) define personal innovativeness as the willingness of an individual to try out any new information technology. It can be handled that personal innovativeness as influential on usefulness perception (Lu, et al., 2003). It plays an important role in determining the outcomes of user acceptance of technology (Yi et al., 2006). Personal innovativeness has been examined in not only innovation diffusion research (Rogers, 2002, 2005) but also information system fields (Agarwal and Prasad, 1998). According to authors' conceptualization of personal innovativeness, a person is called as innovative if s/he is early to adopt an innovation (Agarwal and Prasad, 1998; Xu and Gupta, 2009). In this study, personal innovativeness is considered as an antecedent of technology acceptance process.

2.3. End-User Satisfaction

Satisfaction is a concept that has been investigated in different fields of management researches such as job satisfaction, organizational satisfaction in organizational behavior, customer satisfaction in total quality management and marketing. On the other hand, end-user satisfaction is defined as *"the affective attitude towards a specific computer application by someone who interacts with the application directly"* by Doll and Torkzadeh (1988). Moreover, end-user satisfaction differentiates from the role of employees that is prescribed before. Describing end-user satisfaction, Davis and Olson (1984) classified users' roles as primary and secondary user roles. Primary users are interested in output of the system, so they perceive the system as an information resource. On the other hand, secondary users are interested in interaction with the system and evaluate whether it is easy of use.

For overall evaluation of end-user satisfaction, Doll and Torkzadeh (1988) have elucidated the end-user satisfaction construct by means of three components entitled content, accuracy, format, ease of use and timeliness.

Many researches have been conducted many researches to put forth the relationship between technology acceptance and user satisfaction (Adamson, Shine, 2003; Kim, Chang, 2007; Wixom, Todd, 2005). They propose that the more easy to system use, the higher satisfaction of users have, the more easy to accept using it.

2.4. User Involvement

User involvement refers to *"participation in the system development process by representatives of the target user group"* (Ives & Olson, 1984). Many researches indicate that whether employees have a chance to participate the implementation of a system, they will probably incline to accept and use the system or computer application. (Baronas, Louis, 1988; Barki, Hartwick, 1989; Doll, Torkzadeh, 1988; Swanson, 1973) In addition, there is a positive relationship between user involvement and implementation success which is measured by actual usage (Danet, 2006). Furthermore, Hunton and Beeler (1997) propose that system implementation success depends on having been impression of responsibility and ownership towards system by employees.

3. Conceptual Framework and Propositions

On the basis of the technology acceptance model, theory of reasoned action, theory of planned behavior and diffusion of innovation theory, we aim to shed light on the employees' acceptance behavior towards a new system or computer application. To do that, we integrate the unified theory of acceptance and use of technology, personal innovativeness, user involvement and user satisfaction. As a result of the integration, we propose that personal innovativeness and user involvement are antecedents of the acceptance and use of technology and then attitude toward using as well as implementation success measured by actual use. In addition, we aim to explore the effect of user involvement on user satisfaction and attitude toward using as well as implementation success.

We put forward some propositions and then show them schematically with Figure 7. We need to bring theoretically together all concepts that we have mentioned in the literature review part. Then we explain some logical linkages among these concepts by means of propositions.

When we overviewed two dimensions of first version of technology acceptance model, we saw a powerful connection among both of them. They are significantly related with each other. This relation pushes the concepts to be integrated under the same roof. Perceived usefulness and perceived ease of use are complementary dimensions.

Innovative individuals are eager to learn new technologies and to use them while doing their tasks. This increases automatically their technology acceptance rate. So it gives us a chance to discuss in detail personal innovativeness as an antecedent of technology acceptance and assert an assumption about it.

P1: Highly innovative people are active information seekers of new ideas.
P2: Highly innovative people are easy adaptor to technological changes.

Since innovative people have relatively high willingness to adapt new technologies, they tend to expect high performance from the information system. This supports the unified dimension, as seen in Venkatesh et al.'s unified model (2003), includes both perceived usefulness and relative advantage. Because individuals gain benefit from the system and consider it as an advantage to perform well. They think that they will give an outstanding performance via the new system.

P3: Highly innovative people are expected high performance about the system which they use.

The participation of an individual to a system implementation makes easier to be familiar to the system. This brings with use and acceptance of technology. So we can make the below sentence as proposition.

P4: More participation to the implementation to a system brings higher acceptance and use of technology.

There are some variables pushing the innovation diffusion process. One of them is about individuals who are innovative. Those people make the orientation and acceptance process more quickly. They are important determinants of the process. This also provides that the system is implemented well.

P5: Highly innovative people are one of driving forces behind the process of innovation diffusion in a workplace.

It is difficult to attain the expected result from technology implementation process. Sometimes it can be really forcible for companies. However,

P6: Technology implementation success depends on acceptance and use of technology.

Highly involved people are totally interested in a new system. They want to integrate with the system and also try to internalize it in their daily work lives. So, this involvement of the user to a system implementation makes them feel satisfied with the system. It also helps to increase relatively their performance.

P7: Highly involved people to a system feel more satisfied with the system.

Social relationships have great importance in the workplace. Employees spend some time with their workmates at social context while working. When a new technological system is set up in the workplace, adaption of each person is not the same. Lower innovative people have difficulty to adopt the system and expect highly innovative people to help themselves. This creates an social network and then find out about social influences.

P8: Lower innovative people are generally tended to interact with social network to adopt to innovation more easily.

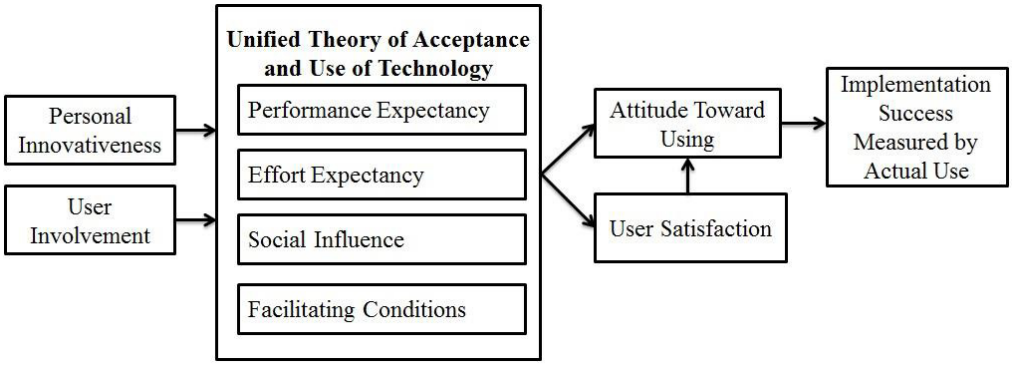

Figure 7. Proposed Theoretical Model

4. Discussion

Based on Technology Acceptance Model, Theory of Reasoned Action, Theory of Planned Behavior and Diffusion of Innovation Theory, we have delineated the Unified Theory of Acceptance and Use of Technology by means of illustrating the relationship with user satisfaction as well as user involvement. Pointing out the need for a broader and dynamic understanding of acceptance behavior, we investigate also personal innovativeness at the root of Unified Theory of Acceptance and Use of Technology.

In the information technology studies, we have observed that there is a gap about the integration of technology acceptance and personal issues. These personal concepts were studied separately in just some papers. We aimed to integrate some personal traits together with unified theory of acceptance and use of technology. We assumed some propositions on the basis of related literature review. The proposition generally seeks to explain unified theory of acceptance and use of technology by other concepts such as personal innovativeness and user involvement. Following the diffusion of innovation literature, we propose highly innovative people accept and adapt to new technologies easily compared to lower innovative people. In addition, highly innovative people could turn in considerable performance as using the system. However, those results depend on existing or new system's structure, design and functionality for their tasks. Whether it is useful, it is easy to use, it meets their task needs and important others think this system should use determine innovative people's satisfaction and acceptance the system. On that point, user involvement is essential concept to facilitate innovative people's acceptance behavior because it is good to see those there voicing their opinions about the system. On the other hand, social influence is critical concept for lower innovative people. Whether individuals are perceived they should use the new system by important others, they would willingly accept it.

This paper builds and extends earlier work that the relationship between technology acceptance and personal innovativeness, user involvement as well as user satisfaction. We have written some sentences by making some relationships. When we consider all variables together, we made some comments and create relations. These relations will help to shape our hypotheses for the next research. All propositions will be formulated to hypotheses and then tested in some fields for future research. This field can be public sector as much as private sector.

Our research attempts to make several contributions to the literature, particularly proposing the model and identifying the antecedents of Unified Theory of Acceptance and Use of Technology.

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